MINISTRY OF THE ENVIRONMENT

1984/85 EDP SYSTEMS PLANS

APRIL, 1984

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MEMORANDUM

April 30, 1984

TO: All Directors
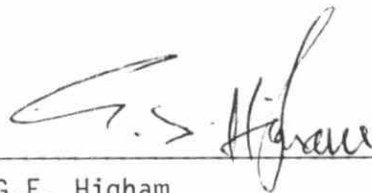
FROM: G.E. Higham
                 Executive Director
                 Finance and Administration

RE: 1984/85 EDP SYSTEMS PLANS

The 1984/85 EDP Systems Plans presents an overview of the
information needs by program and a summary of the Ministry
EDP Budget showing a breakdown of the EDP Services Budget
and the Office of Systems Development resources allocation
by program and activity.

In addition, the report also provides a brief description of
the Systems Development Strategy being followed and highlights
some of the general concerns we have and some of the solutions
planned for implementation.

A second report for submission to Management Board will provide
additional detail on such items as the Ministry's Tendering
Plans and additional budget allocations for equipment and
software maintenance.

G.E. Higham

CONTENTS

INTRODUCTION

The Ministry of the Environment is involved in a wide variety of programs and activities ranging from the monitoring of air and water quality to the development and operation of treatment utilities. In delivering the programs, the collection and analysis of data plays an essential part.

Over the years a large portion of the data handling functions have been automated. In 1975/76, the Ministry's budget for EDP services in the Branches and for Systems Development and Systems Operations was in the order of a half a million dollars. In 1984/85, the budget will be nearly four million dollars. A great portion of this increase is due to the increased use of the government's computer centre, the acquisiton of equipment by the branches, and the development of branch systems personnel.

Over the last decade the Ministry's data processing approach has evolved from a highly centralized operation to a widely dispersed distributed data processing approach employing micros, minis and mainframe computer technology interconnected through various means of telecommunication services. Many of the functions that were once carried out by the Office of Systems Development are now carried out by the Branches.

In moving to this new mode of operation a number of impacts have been felt, some well defined, others more subtle. In the 1984/85 Estimates Report we would like to address some of these impacts by:

- briefly describing the Systems Development Strategy presently being followed

- highlighting some of the concerns being expressed in various quarters

- outlining some of the solutions being planned for implementation in 1984/85

- stressing the need for the development of a Long-Range Information Systems Plan

- providing an overview of the major work by Program to be undertaken in 1984/85

- summarizing the Ministry budget

SYSTEMS DEVELOPMENT STRATEGY

The role of the Office of Systems Development is:

- to co-ordinate the Ministry's Informations Systems Planning function

- to develop information systems in accordance with the Ministry's priorities and in compliance with Government and Ministry policies and procedures

- to provide information systems operation services employing the necessary controls and ensuring security of the information processed.

In order to carry out this role effectively and efficiently a systems development strategy was drawn-up. The major objectives of this strategy are to:

- minimize duplication of effort in the development and operation of systems

- stress consistency in data collection and presentation

- facilitate integration of data derived from various sources and stored in different systems.

- provide access to the data collected and the analysis tools available

- promote a better understanding of the relationships and decision-making processes associated with the various information needs of the organization

- encourage the pulling together of various organization units in the drawing-up of plans and carrying out of projects

- allow for a modular approach in the development of systems to facilitate control and permit flexibility in meeting urgent priorities

- ensure the high priority information needs of the Ministry are being addressed.

The cornerstones of the present strategy are:

(1) Information Resources Concept

(2) Downsview Computer Centre

(3) Distributed Data Processing

(4) User Systems Expertise

(5) Senior Management Direction

(6) User Involvement

A brief description of each of the cornerstones follows.

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(1) Information Resources Concept

The first cornerstone, the Information Resources Concept, is based on the need to develop and maintain inter-system relationships and to apply, whenever possible, a consistency to the coding structures, code interpretations and file formats used in Ministry systems. The approach taken involves breaking down the overall needs of the Ministry into major system components such as the:

- Sample Information System

- Air Quality Information System

- Utility Monitoring Information System

- Industrial Monitoring Information System

- Waste Site Information System

For each major system a core desription file has been developed which will:

- provide the data elements commonly required to support the associated modules, files and reports

- promote consistency in data recording and reporting and minimize duplication of effort involved in creating and maintaining duplicate data elements

- provide key linkage identification and promote, through key code fields, potential for use of multi-system information

- assist in bringing together various organizational units in both the collection and analyses of data

In general, the format of the core description files contain the following information:

- record identification number and name

- classification and status codes

- location codes, including county, district, region codes; latitude and longitude; UTM; hydrologic codes

The record identification numbers appear also in each of the associated modules and provides the linkages for integrating data from various files.

(2) Downsview Computer Centre

The second cornerstone, the Downsview Computer Centre (DCC), is the Central Repository for the Ministry's data banks. There are a number of major advantages to the Ministry in using the DCC mainframe computing facilities:

- it provides a common hub for the telecommunication activities between the Regional branches, Head Office branches and the Ministry systems. In the future this will become more important with the development of a government data network

. it provides virtually unlimited storage capacity for the larger ministry systems data files.

. it facilitates the transfer and sharing of data between systems. For example, the files of the Industrial Monitoring Information System, (IMIS), the Industrial Waste Waybill System, (IWWS), and the Waste Site Information System, (WSIS), will be shared. In the future this file sharing could be expanded to include other systems.

. it provides a set of packaged programs common to all resident systems. Some of the more frequently used are:

. Resource Access Control Facility (RACF) which provides various levels of access security to resident data files

. System Productivity Facility (SPF) which provides full screen TSO access that can be used for a great variety of functions from program development to design and implementation of data input and retrieval screens.

. Generalized Information System (GIS), which provides the means to program ad-hoc type system reports relatively quickly

. Easytrieve, a programming language designed for use by non-programmers

. Statistical Analysis System (SAS) which provides access to pre-programmed functions that can be used for statistical analysis of Ministry System Data.

(3) Distributed Data Processing

The third cornerstone, Distributed Data Processing, places into the hands of the user the computer power needed to manipulate and analyze the data. In moving to a DDP approach the following pattern is usually followed:

. acquire equipment

. distribute data retrieval functions

. distribute data analysis functions

. distribute data input functions

In the Ministry, the Regional Operations Division has acquired computer equipment for the six regional offices and for eleven of the District Offices. This equipment can operate in a distributed data processing mode connected to the Downsview Computer Centre working in conjunction with the Ministry systems located there. Six Ministry Systems have been regionalized providing direct access to their respective data banks.

From the point of view of system use and data integrity, distribution of data retrieval and analysis functions are relatively safe steps to take. However, in distributing data input functions, great care has to be exercised in weighing all of the factors involved (e.g. data input accuracy, correction responsibilities, resource impact on user area etc.). One of the six regionalized systems, the Industrial Monitoring Information System (IMIS), involves the inputting of data in the Regions.

(4) User System Expertise

The fourth cornerstone, User Systems Expertise, has increased significantly over the last five years. Many of the functions that were once centralized have now been relocated. For example, before DDP a Regional Branch user needing information would have to contact a Head Office Branch to provide it resulting in delays and sometimes misunderstandings. Now the user can interface directly with the systems in DCC and retrieve and analyze the data independent of the Head Office Branches.

(5) Senior Management Direction

The fifth cornerstone, Senior Management Direction, is provided through The Systems Review Board (SRB) established in 1979. The board is presently comprised of the following members:

- G. E. Higham (Chairman)

- D. Caplice

- D. E. Redgrave

- A. Castel

- G. Scanlon (Technical Advisor)

The major goal of the Systems Review Board is to determine how best to utilize the systems resources of the Ministry and to be able to respond quickly to new needs and changing priorities as they occur throughout the year.

The major functions of the Board are to:

- assess, prioritize and rank projects

- review overall progress of current projects and approve plans incorporating new projects

Some of the projects reviewed and approved since the establishment of the Board are:

- Nanticoke Environment Management Program (NEMP)

- Waste Site Information System

- Utility Rate Information System (URIS)

- Laboratory Information System (LIS) Phase 1

- Regional Data Processing Strategy Study

- Laboratory Information System (LIS) Phase 2

- Total Utility Monitoring & Management Information System (TUMMIS)

- Regional Data Processing Strategy

- Industrial Monitoring Information System (IMIS)

- Air Quality Telemetry System (AQTS)

- New Industrial Waste Waybill System

(6) User Involvement

The sixth cornerstone, User Involvement, is achieved through the establishment of Quality Review Boards/Committees to oversee the development of projects and ensure the quality of the final product, namely a fully operational system which satisfies the objectives of the users. Quality Review Boards (QRB) are set up for each significant project. Once established, a Quality Review Board will evaluate the quality of project results including design adequacy and proof of accomplishment in meeting project objectives. It will also authorize work to progress based upon detailed knowledge that all required Performance Standards have been followed and successfully met.

Some of the QRBs that have been set up are:

- New Air Quality Telemetry System

- Utility Monitoring Information System (UMIS)

- Total Utility Monitoring and Management Information System (TUMMIS)

- Laboratoy Information Ssytem (LIS)

- Regional Distributive Data Processing System (RDDPS)

- Industrial Monitoring Information System (IMIS)

- New Industrial Waste Waybill System

Examples Of Systems Developed Using Strategy

Some examples of the strategy in use are:

- The Laboratory Information System/Sample Information System/Air Quality Information/Regional Connection (Exhibit 1)

- The Industrial Monitoring/Waybill/Waste Site/Regional Connection (Exhibit 2)

- The Air Quality Telemetry/Air Quality Information System/Regional Connection (Exhibit 3)

- RDDPS Network (Exhibit 4)

Each of the above are illustrated on the following pages.

LIS/SIS/AQUIS/REGIONAL CONNECTION

Processing begins in the LIS with the log-in of samples. The acquisition of results starts with the capture of instrument responses at work stations throughout the laboratory, either directly from on-line instruments such as auto-analysers, gas chromatographs and atomic absorption units, or from off-line instruments via keying-in at terminals.

The evaluation and approval of results for release is based on an interactive dialogue between the system and the senior scientist/analyst/technician responsible.

When all the tests requested in a sample submission have been completed, a final analytical result report is printed for distribution to clients. In addition, the sample results data is transmitted to the SIS system at the Downsview Computer Centre.

The SIS stores the analytical data on Sample Result Master Files by Program/study. Immediately after the SIS files are updated, the data can be retrieved by Regional staff.

The Air Resources Branch updates the AQUIS system with analytical result data contained in the SIS. Regional staff can also retrieve data from this system through their mini-computers.

The LIS/SIS/AQUIS connection demonstrates the use of micros, minis and mainframe computers working in combination to take advantage of the strengths of each of the technologies.

EXHIBIT 1
LIS/SIS/AQUIS/REGIONAL CONNECTION

LIS SUBMISSION SHEETS

DUAL HP-3000 COMPUTERS

LIS DATABASE

INSTRUMENTS

HP-9920 COMPUTER

DIRECT COMPUTER INPUT [DCI]

ANALYTICAL REPORTS

ANALYTICAL RESULTS AND FIELD DATA

SRF TAPE

LABORATORY INFORMATION SYSTEM [LIS]

SAMPLE INFORMATION SYSTEM [SIS]

UPDATE DOCUMENTS

SIS DOWNSVIEW COMPUTER CENTRE

SDF

STATION DESCRIPTION FILE

UPDATE REPORTS

SRM

SAMPLE RESULT MASTER FILE

DATAPOINT MINI-COMPUTER IN REGION

AQUIS DOWNSVIEW COMPUTER CENTRE

RETRIEVAL REPORTS

SIS SRM SUB-SETS

MASTER FILE

REGIONAL DISTRIBUTED DATA PROCESSING SYSTEM [RDDPS]

AIR QUALITY INFORMATION SYSTEM [AQUIS]

9.

IMIS/IWWS/WSIS/REGIONAL CONNECTION

Regional staff enter IMIS monitoring data on their mini-computers. The data is then transferred to the IMIS system residing at the Downsview Computer Centre where it is stored on the Monitoring Data Master File. The IMIS system also maintains an Industry Descriptor File. This file contains descriptive information as well as location codes for each company/plant which is monitored.
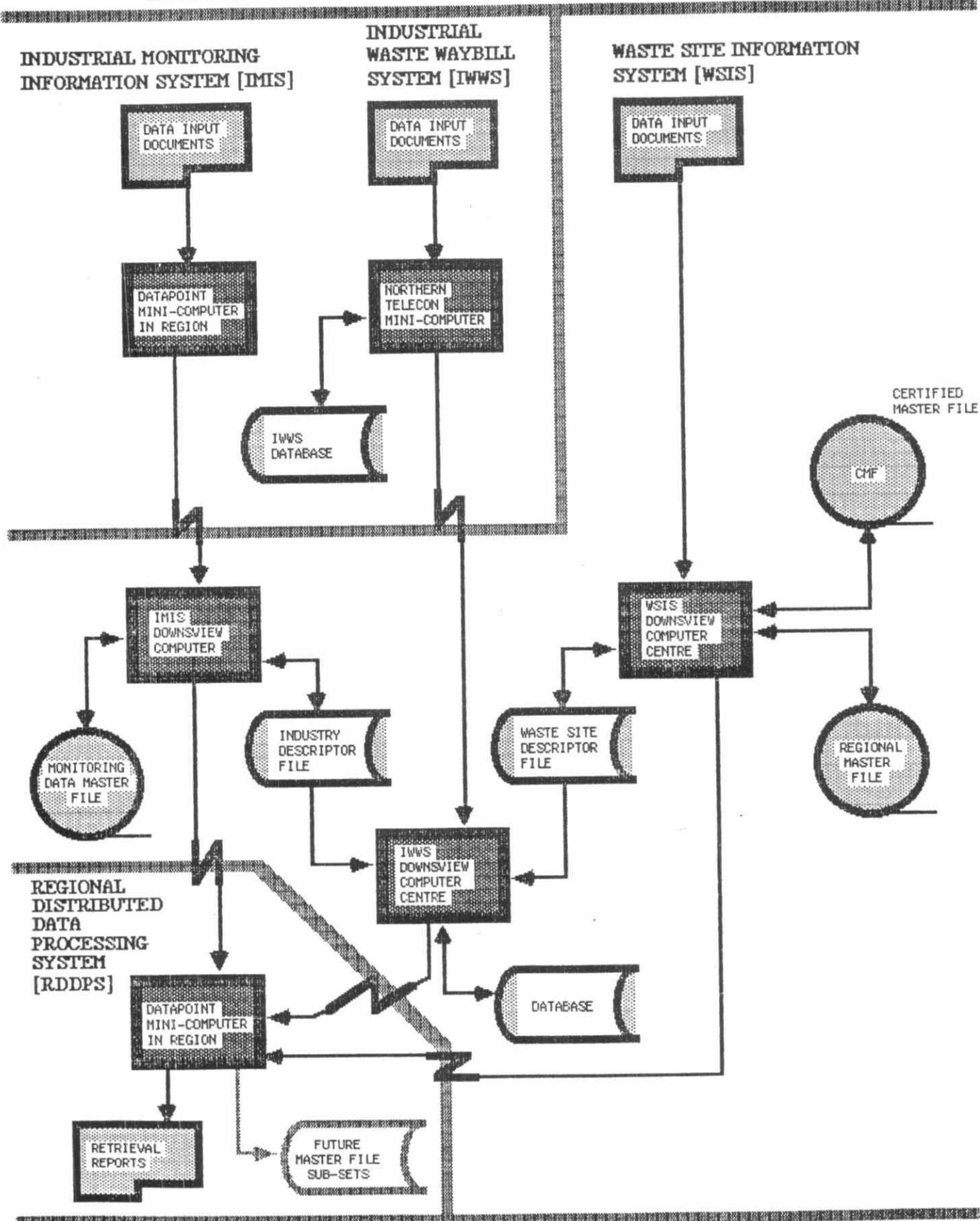
The WSIS system maintains a Waste Site Descriptor File which contains descriptive information as well as location codes for each certified waste site. In addition there are two other files maintained by the system. One file contains information provided during the certification process while the other contains actual field data provided by the Regions.

The IWWS system is divided into two component sub-systems. The Application System component runs on a mini-computer and is used for support file maintenance and waybill reconciliation. The Information System component resides at the Downsview Computer Centre and is updated daily from the Application System. The Waste Management Branch and Regional Offices retrieve information using the Information System.

The above three systems share the Industry Descriptor File and the Waste Site Descriptor file eliminating the need to carry duplicate files and thereby minimizing the risk of creating conflicting information. The sharing of the files by the three systems will also facilitate the integration of information from the three systems.

EXHIBIT 2
IMIS/IWWS/WSIS/REGIONAL CONNECTION

INDUSTRIAL MONITORING INFORMATION SYSTEM [IMIS]

INDUSTRIAL WASTE WAYBILL SYSTEM [IWWS]

WASTE SITE INFORMATION SYSTEM [WSIS]

DATA INPUT DOCUMENTS

DATA INPUT DOCUMENTS

DATA INPUT DOCUMENTS

DATAPOINT MINI-COMPUTER IN REGION

NORTHERN TELECON MINI-COMPUTER

CERTIFIED MASTER FILE

CMF

IWWS DATABASE

IMIS DOWNSVIEW COMPUTER

WSIS DOWNSVIEW COMPUTER CENTRE

MONITORING DATA MASTER FILE

INDUSTRY DESCRIPTOR FILE

WASTE SITE DESCRIPTOR FILE

REGIONAL MASTER FILE

REGIONAL DISTRIBUTED DATA PROCESSING SYSTEM [RDDPS]

IWWS DOWNSVIEW COMPUTER CENTRE

DATABASE

DATAPOINT MINI-COMPUTER IN REGION

RETRIEVAL REPORTS

FUTURE MASTER FILE SUB-SETS

11.

AIR QUALITY TELEMETRY/AIR QUALITY INFORMATION SYSTEM/REGIONAL CONNECTION

The new Air Quality Telemetry Sytem (AQTS) will process air quality data collected by a network of monitoring stations located throughout the province.

Data will be acquired at each station by a logging device which continuously monitors the instruments and calculates and stores average readings for subsequent transmission. These averages can be calculated every 5, 15, or 60 minutes depending on the requirements at a particular station location. The logging device will also monitor the environmental status of a station, and will have the capability to activate instrument calibration units when so instructed. Data will be retained until the station is polled, a process that may occur as often as every few minutes over a dedicated phone line, or as rarely as once per day via the public-dialed network.

The polling will be controlled by network control software residing in a central computer located in the Air Resources Branch in Toronto. The dedicated polling loops, autodial polling modems and Region/District user terminals will connect to a multiplexor located in each Region.

Upon receiving data from a station or another network the network control software will ensure that the transmission was error free before passing the acquired data to the Information System component of the AQTS.

Network control will also be capable of transmitting information to data loggers including station configuration parameters, instrument calibration specifications and commands to perform unscheduled logger functions.

The Information System will accept the acquired data and check the station status flags. Invalid data (eg. malfunctioning instrument) will be used to update system error logs or files. Valid data will be used to update 5, 15, and 60 minute telemetry files which are subsequently used for:

- calculation and storage of an Air Pollution Index (API) and/or an Air Quality Index (AQI) for designated stations.

- production of graphical data display

- production of Telemetry (ie current data) and API/AQI reports.

- creation of telemetry files for transfer to the Ministry's Air Quality Information System. (AQUIS)
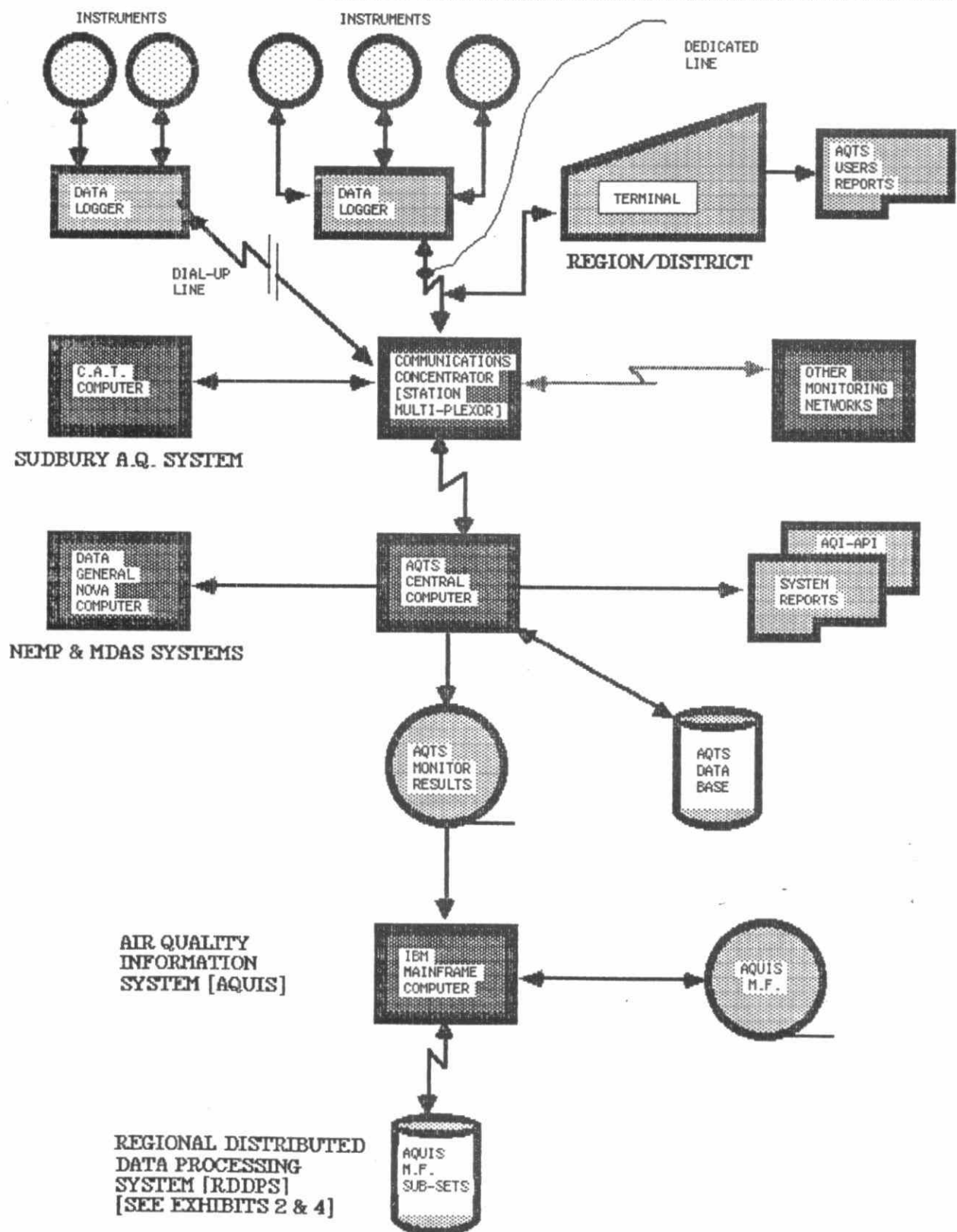
The Information System will also be responsible for other functions such as support file maintenance, calibration history file maintenance, and error/exception reporting.

Access to the Information System and the Telemetry Network will be via user terminals located in Branch, Regional, and District Offices. System outputs such as displays and reports will, in most cases, be routed to the requesting location.

Approximately once per month the telemetry data files will be transferred to the Downsview Computer Centre where they will be used to update the master files of AQUIS. Immediately after the master file update the data can be retrieved by Regional staff.

EXHIBIT 3
AQTS/REGIONAL CONNECTION

INSTRUMENTS

INSTRUMENTS

DEDICATED LINE

DATA LOGGER

DATA LOGGER

TERMINAL

AQTS USERS REPORTS

REGION/DISTRICT

DIAL-UP LINE

C.A.T. COMPUTER

COMMUNICATIONS CONCENTRATOR [STATION MULTI-PLEXOR]

OTHER MONITORING NETWORKS

SUDBURY A.Q. SYSTEM

DATA GENERAL NOVA COMPUTER

AQTS CENTRAL COMPUTER

AQI-API

SYSTEM REPORTS

NEMP & MDAS SYSTEMS

AQTS MONITOR RESULTS

AQTS DATA BASE

AIR QUALITY INFORMATION SYSTEM [AQUIS]

IBM MAINFRAME COMPUTER

AQUIS M.F.

REGIONAL DISTRIBUTED DATA PROCESSING SYSTEM [RDDPS] [SEE EXHIBITS 2 & 4]

AQUIS M.F. SUB-SETS

R.D.D.P.S. NETWORK

The RDDPS network consists of the Downsview Computer Centre (DCC), Datapoint, Hewlett-Packard and DEC Computer Facilities connected, via communication lines, as shown in Exhibit 4. Although not shown in the diagram some of the district offices (e.g. Sarnia) can also be directly connected to DCC.

In the network DCC acts as a common hub for the major Ministry Systems and provides a compatibility link between the differant types of computer equipment located in the regions. Access to DCC can be gained in one of two modes: Interactive (TSO) or Batch (RJE). Typically, while in the TSO mode a user would interact with the computer system and:

- Request access to one of the six Ministry systems now available in the RDDPS

- Enter the retrieval selection criteria

- Submit the retrieval for processing

Once the retrieval processing is complete the output (report data or sub-files) would be routed back to the users computer facility by means of the RJE communications mode.

EXHIBIT 4
RDDPS NETWORK
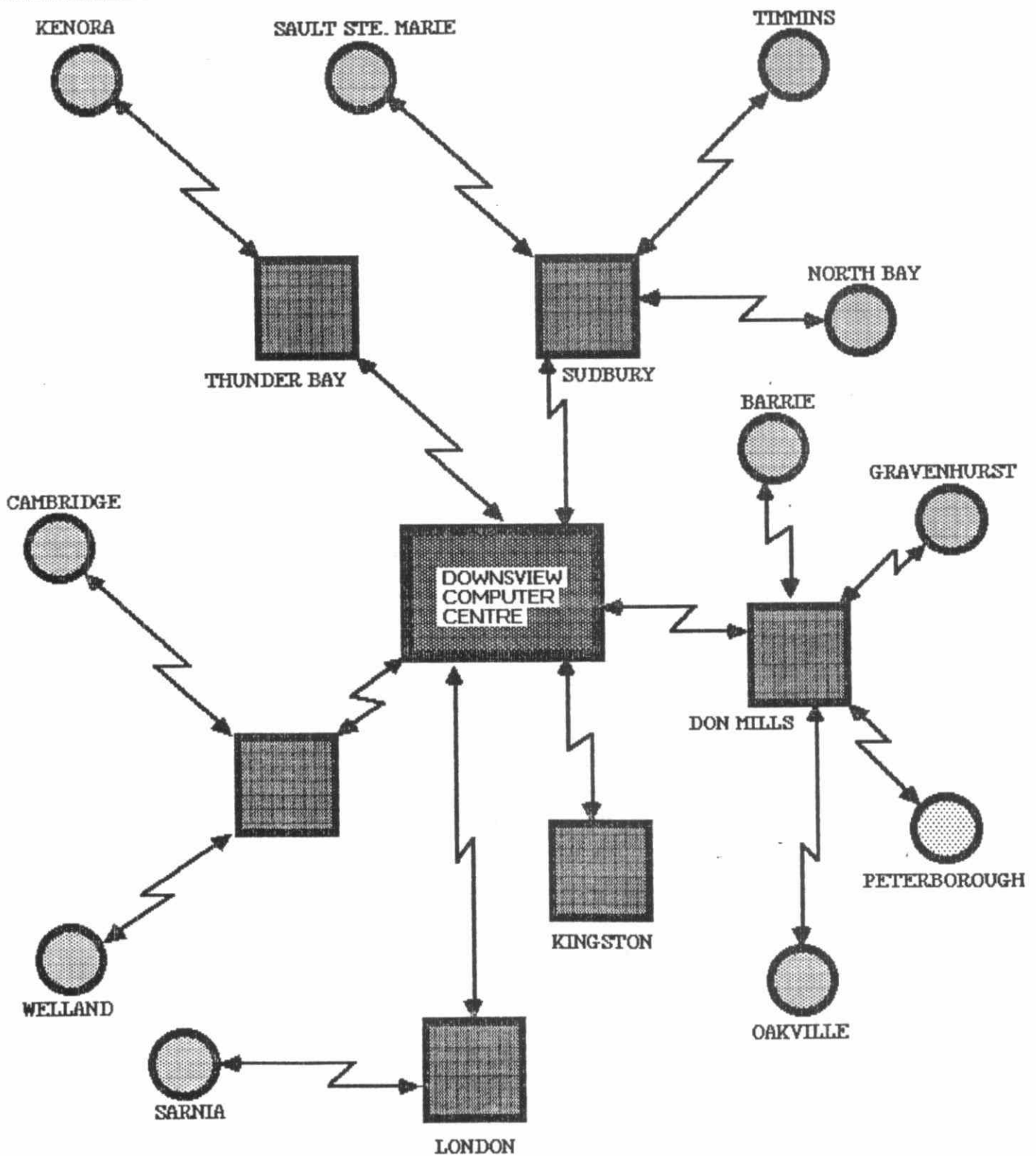
GENERAL CONCERNS

Over the last year a number of major concerns of a general nature have been expressed by parties within the Ministry of the Environment, other ministries and the central agencies. Following is a brief description of some of those concerns.

1.   Micro/Desktop/Personal Computer Acquisitions

Over the last year the Ontario government has acquired a significant number of micro, desktop, personal computers. Some of the questions being asked regarding the influx of these computers are; how can we be sure these will be used effectively; will they lead to a fragmentation of the organization's data base; will they result in duplication of data and effort; could they possibly detract from a person's concentration on his real job?

In order to address these and other concerns the Ministry of the Environment senior management has instituted a procedure that must be followed in the acquisition of micro-computers. The need to describe how the units will be used and the alternatives considered in appropriate justification/feasibility reports will reduce the risk of mis-application. Conversely, if a user has no clear idea how the equipment will be used or is not sufficiently committed to document it, then not only are the chances of failure great, it is highly questionable whether the equipment should be acquired at all.

Although the justification/feasibility study phase of the acquisition procedure appears to be working effectively, problems do exist with the tendering process. These relate to the length of time it takes to prepare the Request for Proposal (RFP) and the unsatifactory response of the vendor community. The RFP needs to be trimmed down and the vendor community has to be made aware of the need to respond to RFP's and how best to do it.

2.   Some Pitfalls Associated With Current Wave of Micro/Desktop Personal Computer Acquisitions

Although micro, desk-top and personal computers can play an important role in the data processing functions of an organization, particularly with respect to the preparation of graphic displays, visual presentations and reports, they also have the inherent potential to fragment and dissapate the information resources of an organization. Some of the problems and pitfalls that may arise from the unco-ordinated and mis-application of micro-computers include:

.   a lack of communication between users of equipment resulting in a duplication of programs and systems designed to perform essentially the same functions.

.   inconsistent coding, data structures and file layouts used to store and process essentially the same type of information.

.   fragmentation of the Ministry's Information Resources through; equipment, data and file incompatibility; data stored on numerous small computer files in different locations; one or only a few people knowing what is on each file

. only those with micro's can use stored information. Others who may require access are excluded

. difficulty in developing and enforcing acceptable system and program documentations standards

. acquisition of inappropriate equipment or software for the function(s) to be automated.

. difficulty in developing and enforcing acceptable back-up and security standards for programs, data files and operating system software

. The cost of the micro equipment is often the most obvious but by no means the most significant portion of the total cost of an acquisition. If special software has to be written then the development resources required may end up doubling or tripling the overall cost of the application.

In the Ministry, the chances of running up against these pitfalls has been greatly reduced through the planning involved in the drawing-up of the feasibility/justification reports and the assessment of solutions involved in the tendering process.

3.   Lack of Micro/Desktop/Personal Computer Support

In the Ministry there have been general concerns expressed with respect to a lack of Micro-Computer support being provided by the Office of Systems Development (OSD). However, in this regard the Ministry situation is by no means unique. In many organizations that have experienced an influx of micro-computers the lack of central support is a common complaint. The major reason why central groups are facing difficulties in this area can be summarized as follows:

. to become suitably proficient in the use of a particular piece of equipment or packaged software requires "Hands-on" experimentation and use in a number of different applications. Gaining the desired level of proficiency requires a significant investment of time and staff resources. This does not constitute a particularly serious problem if applied to one or even a few Equipment/Software combinations. However, the great diversity and turn-over in the in the micro-computer field adds a degree of complexity that makes it difficult to decide where resources should be invested. A good example of this diversity is in the Ministry of the Environment where we have micro-computer equipment from the following vendors:

-    HEWLETT PACKARD
-    DEC
-    APPLE
-    DATA GENERAL
-    IBM
-    COMMODORE
-    OSBORNE
-    AES

Associated with these vendors are different computer models and a wide array of packaged and specifically designed software. In most cases, he branch acquiring micro/desktop computer will be responsible for the development, implementation and support of application software.

Early in 1984/85 OSD plans to acquire a micro for in-house use and, after a brief familiarization period, may be able to provide some degree of support to user Branches.

4.   Unfriendly Systems

In the latter part of 1983/84, a Satisfaction Survey was distributed to regional personnel interfacing with the initial six Ministry systems selected for regionalization. With respect to the friendliness of the systems, the observations concerning one of the systems ranged from:

.   the system is very easy to use, the manual is easy to follow

.   the system is extremely difficult and frustrating to use and the manual is impossible to follow

In developing the Regional Distributed Data Processing System, the first priority in regionalizing the six systems selected was to provide access in the shortest manner possible. This essentially meant taking batch orientated systems and applying the modifications required to permit remote terminal input of retrieval selection criteria and routing of the selected information back to the appropriate computer facility. Now that this first level of access has been provided the following steps to make the systems more user-friendly are planned:

.   conduct more training sessions

.   provide Computer Based Training (CBT) modules accessible through the regional and head office terminals

.   improve terminal displays

.   modify systems accordingly

5.   Data Coverage and Timeliness

With respect to several Ministry systems, concern has been expressed
about the completeness and timeliness of the data bases. For example:

.   not all of the samples being received by the laboratory are
           properly coded and consequently are not entered into the
           Sample Information System (SIS)

.   some of the air quality data is not entered into the Air Quality
           Information System (AQUIS) until long after it has been
           received by the laboratory

.   the input of monthly industrial monitoring data requires
           resources which some district offices do not have.

In 1984/85, steps will be taken to outline areas where additional
operations support in terms of training and resources is required

6.   Lack of Data Analysis Tools

In the meetings of the Regional Distributed Data Processing Committee
(RDDPS), the need for data analysis tools to work on the data retrieved
has been expressed.

It has also been stated the use of packages like S.A.S. for statistical
analysis take too long to learn. "We're not computer specialist. We're
paid to deliver a program. We need analysis tools that are easy to use."

In 1984/85, steps will be taken to assess the feasibility of
providing prime statistics within some of the Ministry systems.
Also, greater emphasis on training with respect to some
of the analysis tools available will be given.

7.   Lack of Co-ordination

In developing systems, the needs of the various branches involved in
the associated functions are considered. This usually results in a operating
system that requires the participation of a number of branches. For
example, the Sample Information System (SIS) involves the Laboratory
Services and Applied Research Branch, the Air Resources and Water
Resources Branches and other Head Office sample-taking branches and
the Regional Branches. In order for these multi-branch systems to operate
successfully, co-ordination and co-operation between the involved branches
is necessary.

In the case of the SIS, the establishment of a SIS steering committee
or some other like-mechanism will be required to ensure that samples
are properly coded, data entering the system is checked and corrections
made, training in data retrieval and analysis techniques is conducted,
and that the necessary modifications and extensions are made to keep
the system current.

8.   Lack of Control

Over the last several years a number of significant changes have taken place with respect to systems development and systems operations:

- The shift to a distributed data processing mode has increased tremendously the number of people involved in data processing functions

- The acquisition of micros/personal computers/desktop computers has also added to the number of people involved in data processing

- not only has the number of people involved in data processing increased, the types of things they are doing with the equipment acquired varies widely.

This scattering of involvement has made the job of controlling the various operations and procedures that much more difficult. Over the next year the need for better means of control will be assessed and appropriate steps taken.

Summary

In summary, the Ministry has emphasized the need to exercise appropriate management control over systems acquisitions through the means of conducting suitable feasibility studies and tendering processes. The Ministry has also recognized the need to have in place a Systems Development Strategy and a Long Range Information Systems Plan to facilitate co-ordination and control. The need for co-ordination and control has become increasingly important as more people become involved in the development and operation of systems. As systems resources and responsibilities are distributed, greater attention will have to be placed on ensuring that support for these systems is in place. In addition, greater emphasis will need to be placed on the training of user personnel. Consideration should also be given to holding periodic conferences and information exchange forums to improve communications between Branches and Divisions and to foster co-operation and support.

One of the major benefits to be derived through the development of automated information systems is the increased sense of the need for teamwork within an organization to meet overall goals and objectives. This need to pull togther can be demonstrated in the implementation of the various Ministry systems which cross organizational boundaries.

Over the last several years the Ministry has taken tremendous strides with respect to the automation of operational data and has made significant advances in this area. It is now time to devote some considerable effort to the consolidation of those advances.

With respect to the automation of management type data, the Ministry has just begun. Because of the subtlety of some of the processes involved in decision-making and the experimental nature of some of the tools becoming available, a certain amount of flexibility and risk-taking must be accepted in order to arrive at an appropriate pathway. Over the next year a greater emphasis will need to be placed on fitting these tools to meet the needs of the senior executive of the Ministry.

LONG-RANGE INFORMATION SYSTEMS PLAN

Over the last decade the Ministry has employed a variety of computer processing technologies and approaches in developing its information systems. For example:

- the Laboratory Information System (LIS) utilizes a large dual mini-computer system with 30 terminals employing a Data Base Management System in a real-time on-line approach to satisfy its daily operating requirements

- the Regional Distributed Data Processing System (RDDPS) utilizes mini-computers located in Regional and District Offices connected to the Downsview Computing Centre via both high-speed (RJE) and low-speed (TSO) communication lines to access the Ministry central corporate data bases

- the micros, desk-top computers and personal computers located in the Branches that provide word processing, graphic display, report preparation, basic budgeting and statistical capabilities

- the centralized, IBM mainframe systems located in the Downsview Computing Centre that provide access and use for various client branches

Because of the many changes which have taken place in the Ministry, particularly with respect to Regionalization and Re-organization, and the rapidly evolving information systems technology, a number of concerns have been expressed:

- how has re-organization and the new mandate and roles of the Branches affected the information processing needs of the Ministry

- what are the new priorities and where should we be devoting our system's resources

- in light of the rapidly evolving computer technology and the availability of micro, desk-top and personal computer equipment how can we safeguard against the dangers of:

  - mis-use of resources

  - duplication of effort

  - duplication of data and resulting discrepancies

  - inability to integrate data

  - fragmentation with respect to overall information needs of the Regional Operation Division, the Head Offices Branches and the Senior Executive of the Ministry

In order to address these concerns and to make full use of the resources available, the development of a Ministry-wide Long-Range Information Systems Plan (LRISP) is essential. This plan should include:

- information needs over the next five to ten years

- systems development projects underway, planned and required to meet needs

- resources required to carry out the projects

- resources required to support information systems in operation over the next five to ten years and the associated needs of the various user areas

- information systems architecture showing the different types of data processed in the Ministry, how the data is used and the inter-relationships involved

- appropriate blend of information processing trechnologies to meet the needs

- policies and procedures to ensure compliance with the Long-range Information Systems Plan of the Ministry

- review process to ensure that the plan will evolve over the years to meet changing needs and conditions

The major reasons for the Long-range Information Systems Plan are:

- to ensure that the systems resources of the Ministry are used effectively on the high-priority information needs as identified by the Systems Review Board and Senior Ministry Management

- to promote a better understanding of the inter-relationship and decision-making processes associated with the various information needs of the organization

- to minimize duplication of effort in both the development and operation of systems, stress consistency in data collection and presentation and facilitate integration of data derived from various sources for various purposes

- to encourage the co-ordination of various organization units in the drawing-up of plans and the carrying out of programs

- to allow for a modular approach to be adopted in the development of information systems so as to facilitate control and permit flexibility in meeting urgent priorities

.   to promote the co-ordinated development of the Ministry's information
            resource

.   to promote an understanding of information processing technology and
            information management techniques and their application within the
            Ministry

The Long-range Information Systems Plan should paint a picture of where the Ministry
should be five years and ten years from now with respect to information processing
and should outline how best to use our human resurces in both the user areas and the
centralized area to ensure that the picture is realized successfully.

The LRISP would provide criteria to assist Ministry personnel in deciding what blend
of technology shoud be used in developing a system, whether an independent, local
micro solution should be used, whether a mainframe solution should be used or whether
a distributed data processing approach should be employed.

The need for a Long-Range Information Sytems Plan is now being reviewed by the
Systems Review Board.

OVERVIEW OF 1984/85 EDP SYSTEMS PLANS

In the estimates meetings held with the Branches an overview of the work to be done has been compiled. Additional meetings will be held to clarify and prioritize the various projects, modifications and extensions outlined. Following is a brief description of the highlights of the 1984/85 EDP Systems Plans.

Program 1 - Finance and Administration

In Financial Services the following improvements to the COBIS financial reporting system are planned:

- on-line editing and enquiry with respect to payments to vendors

- on-line appropriation control

- regional print-outs and data transfers

- other modifications and extensions as required.

A new Assets Inventory Information System will be developed emphasizing User Branch involvement, improved editing and control features and a finer and more accurate description of inventory items for reporting purposes.

In the OSD, the Systems Operation Section will release a Request for Proposal for a new Input/Output Processor to replace the present Remote Job Entry equipment. The evaluation of the proposals received will be reviewed with the Systems Review Board to determine the appropriate follow-up action to be taken.

In the area of Information Technology Security, co-ordination will be provided to the User Branches in the drawing up of plans and monitoring of follow-up activities.

The need for a Long-Range Information Systems Plan has been long recognized. The drawing-up of a practical and yet visionary plan will require the intensive effort of the OSD and all of the User Branches.

Program 2 - Environmental Planning

In Air Resources, the development of the new Air Quality Telemetry System (AQTS) will involve the following steps:

- finalize selection of successful vendor

- review Vendor Evaluation and Selection report with Ministry Senior Management and Management Board for approval to proceed

- draw-up contract

- review systems design specification

- conduct systems acceptance testing of systems components and overall system

- implement significant portion of new system

Significant systems development work is planned with respect to modelling activities and the Meteorological Data Acquisition System (MDAS). Much of this work will be tendered out to external consulting firms.

In Water Resources, modifications and extensions to the Sample Information System (SIS) will be implemented in support of the Drinking Water Program. Seminars will be conducted with respect to data retrieval and sample submission coding. Modifications and extensions with respect to loadings, IJC interfaces, waste assimilation, Toronto Watershed program and the fish analysis program will also be investigated, resources permitting.

The need to expand the Hydrologic Information System (HIS) with respect to additional streamflow analysis reports will be assessed.

Modifications and extensions are planned to the Utility Information Systems, UMIS and TUMMIS, with respect to additional criteria and reports. Assessment of on-line correction to master file data will be made stressing the need for control and audit reports. The need for microfiche record keeping will also be assessed.

In Waste Management, the development and implementation of the new Industrial Waste Waybill System (IWWBS) will involve the following steps:

- review and approve systems design specifications

- conduct systems acceptance testing

- provide support throughout implementation of new system

With respect to the Waste Site Information System (WSIS), the following activities are planned:

- provide support on the matching of the Regional information with the Approvals information

- extend WSIS to include the closed site inventory

- provide support with respect to modification and extensions

In Hazardous Contaminants and Standards, several EDP initiatives are planned including the carrying out of a feasibility study concerning the development of a Hazardous Contaminants Information System.

In Laboratory Services and Applied Research, modifications and extensions to the Laboratory Information System (LIS) are planned to improve sample submission and management reporting capabilities. Further implementation of Direct Computer Input (DCI) processes will also be undertaken.

An expansion of the Dorset computing facilities to meet the high priority needs of the Acid Rain Program will involve the following steps:

- complete feasibility study and obtain approval from the Systems Review Board and Management Board to proceed

- prepare Request for Proposal and release to vendors.

- select vendor and proceed with implementation

25.

Program 3 - Environmental Control

In Program Administration, a number of incentatives have been identified with respect to the Regional Distributed Data Processing System (RDDPS).

- provide division summary reports across the region with respect to Industrial Monitoring, Complaints and Spills and Budget/Expenditure Status.

- improve interface between regions and Ministry Systems by making them more user-friendly

- investigatethe practicality of implementating Computer Based Training modules (CBT) to facilitate the use of Ministry systems

With respect to the Industrial Monitoring Information System (IMIS), meet additional report requirements and assist in the implementaion of input/output interfaces with the District Offices.

The expansion of the Thunder Bay Computer Facilities will require the following steps:

- complete feasibility study and obtain approvals from the Systems Review Board and Management Board to proceed

- prepare Request for Proposal and release to vendors

- evaluate vendor proposals, obtain necessary appovals, and proceed with implementation.

4.   Utility Planning and Operations

In Capital Financing and Revenue a number of major changes have been identified for 1984/85.

- because of fundamental changes in the program, major changes will be required in the Utility Rate Information System (URIS).

- implementation and subsequent support of the new Provincial and Municipal Billing and Revenue System will be provided.

- a need for an overall study of the interrelationships between the existing systems to determine the most appropriate integrated approach has been identified. The study would involve a review of Initial Rate Calculations, Utility Rate Information System, COBIS, Provincial & Municipal Billing and Revenue, and other related functions.

MINISTRY EDP SYSTEMS PLANS SUMMARY

For the 1983/84 fiscal year, the major components that make up the Ministry EDP systems plans were estimated as follows:

1.   EDP Services in Division/Branch Budgets:

. Finance and Administration	390.5
. Environmental Planning	1,149.9
. Regional Operations	222.0
	1,762.4

2.	Special Projects:	
	Air Quality Telemetry System	500.0
3.	Office of Systems Development	914.9
4.	Other Computer Systems Related	500.0
	Complement in Branches	
		3,677.3

These figures do not include maintenance for hardware and operating software which is becoming an increasingly significant component with the acquisition of more equipment.

For the 1984/85 fiscal year, two major components have been set:

. EDP Services in Division/Branch Budgets	1,735.0
. Office of Systems Development	940.2

These figures have been allocated to the Division/Branches as shown in Table 1. Additional EDP Systems Plans information will be provided in a second document that is compiled for the Management Board Secretariat.

TABLE 1

SYSTEMS SUMMARY

1984/85

PROGRAM ACTIVITY	EDP SERV-ICES	OFFICE SYSTEMS DEVELOP-MENT	TOTAL
1. Ministry Administration			
Financial Services	123.0	19.2	142.2
Personnel Services	26.0		26.0
Analysis and Planning	19.0		19.0
Systems Development	134.2		134.2
1. Data Control		153.5	153.5
2. Data Entry		172.7	172.7
3. Information Centre		101.2	101.2
4. Systems Operations I/O Processor		29.7	29.7
5. Micro Computer Facility		10.2	10.2
6. Long-Range Info. System Plan		12.4	12.4
7. Management Support		91.1	91.1
	302.2	590.0	892.2
2. Environmental Planning			
Air Resources	260.0	18.5	278.5
Water Resources	260.0	42.2	302.2
Waste Management	232.8	37.0	269.8
Hazardous Contaminants & Standards	19.0		19.0
Environmental Assessment	1.9		1.9
Laboratory Services and Applied Research	271.0	58.1	329.1
Program 2 – System Maintenance & Extensions		40.0	40.0
Program 2 – New Work		14.7	14.7
	1,044.7	210.5	1,255.2
3. Environmental Control			
Program Administration	231.0	59.7	290.7
Program 3 – Maintenance & Extensions		20.0	20.0
	231.0	79.7	310.7
4. Utility Planning & Operations			
Capital Financing and Revenue	155.0	50.0	205.0
Project Engineering	2.1	10.0	12.1
	157.1	60.0	217.1
	1,735.0	940.2	2,675.2

MANAGEMENT BOARD SUBMISSION

The EDP Systems Plans submission to the Management Board Secretariat consists of the following items:

- Activity Summary for each activity having an EDP budget. The activity summary allows for a breakdown of the following items.

    - Primary Data Processing

    - Ancillary Data Processing

    - Equipment and Software

    - Telecommunications Services

    - Systems Administration

    - Systems Development

    - Systems Maintenance

- Tendering Activity covering 1983/84 and 1984/85 and 1985/86.

- System Summary and Project Summary for the larger Systems (150,000) and projects (250,000).

The detail information necessary for the submission to the Management Board Secretariat and for the Ministry's internal planning pruposes is now being collected and compiled through a series of meetings being held with the Branches.